In Out Tracker

Tracker to manage public spaces capacity, entrances and exits during the pandemic and in general

Helpful for mall customers, security guards, managers and analysts

Introduction

- COVID-19 Pandemic has led to some restrictions, namely, the maximum number of people in a certain public space.
- We find necessary to have some sort of way to automatically manage this limit of people on stores and malls, for example
- In a world without pandemic restriction, there is also continuous waiting in lines at stores, so it would be useful to have a system where we could access the capacity of a public place in order to decide whether we intend to go there or not.
- Our system seeks to help in the management of shopping centers and stores, but also in providing the information acquired by the entrance and exit sensors to customers so that they have access to the current capacity of a mall and/or store.

Vision statement

- The system will manage all the entrances and exits of stores in several malls.
- It will be possible for people to check whether it is possible to enter a store or if the capacity of the store is at the maximum, being the main goal of the system to control the agglomerations of people due to the pandemic.
- In case there are agglomerations inside the malls or stores, the securities of the mall will have their life easen because with the application it will be easier for them to know where the agglomerations are, and they can go there and solve this issue.
- The application will also have a manager side, that will allow for mall managers to see the statistics of every store, like how many people go there in a day

Our application works for managers, security guards and clients.

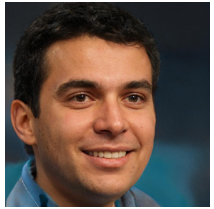
Personas

Name: Bruna

Gender: Female

Age: 40

- Lawyer
- Bruna likes to go shopping
- Sometimes the shops are full and the waiting time is to much for her
- She **needs** an app to check how busy the mall and stores are



Name: Manuel

Gender: Male

Age: 48

- Manager
- Manuel is the manager and analyst of some malls in Aveiro
- Its difficult to analyze a store performance without some official values captured by a real time software
- He **needs** a software that manages the mall and stores the relevant information for further analysis

Name: Pedro

Gender: Male

Age: 38

- Security Guard
- Pedro makes sure the mall and stores are secure and the DGS security measures are respected
- A mall has multiple stores and it is too big for him to manage it without any technical help
- He **needs** A Software that manages the mall and notifies him of potential incorrect/dangerous behaviours

Main Scenarios

Bruna checks mall capacity:

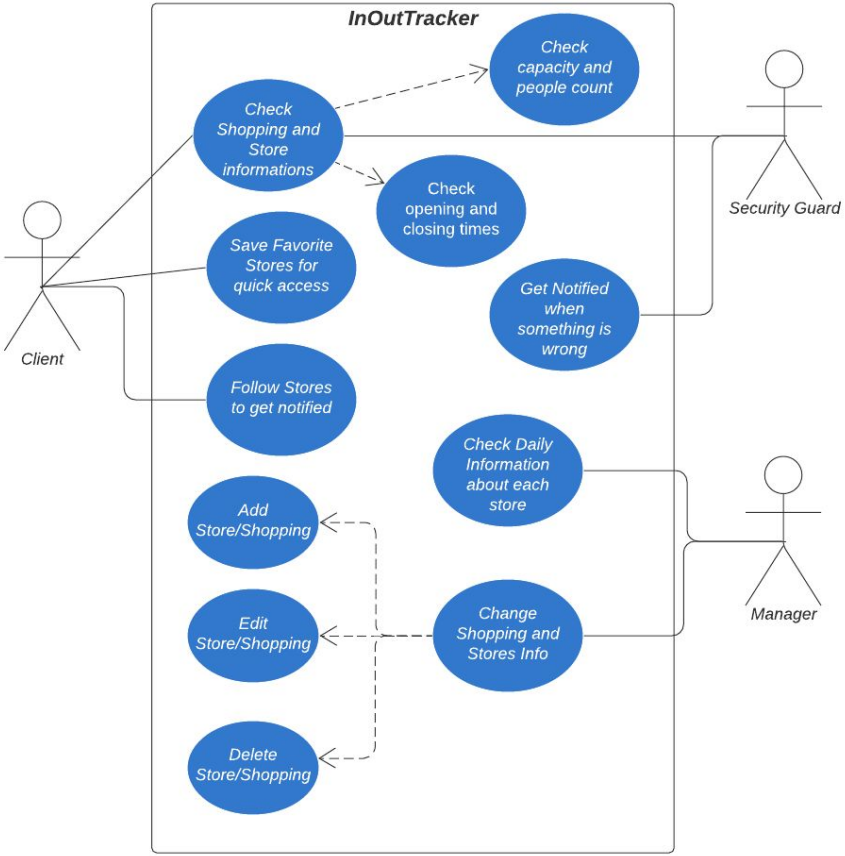
Bruna opens the application -> Chooses the desired mall/stores that she wishes to go shopping -> She checks if the mall is busy -> Decides to go since there is few people on the mall

Pedro gets notified that there's more people than allowed at a store:

Pedro has the software running and connected to the mall surveillance system -> the capacity at a store reaches the maximum and there's more people than allowed in that store -> The software alerts Pedro -> He goes there to solve the issue

Manuel is asked to analyze last week's performance of a store:

Manuel logs in with his manager account -> chooses the store he wishes to fetch the data -> He will be presented with a graph with how many people were in that store for each hour of the day.

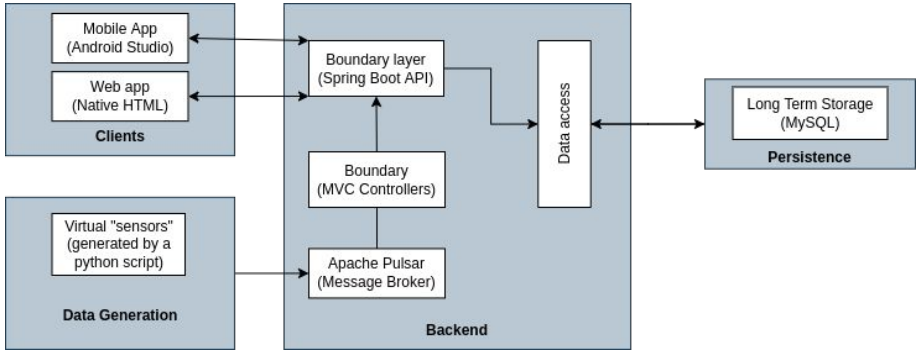


Key requirements and constraints

There are some key requirements and system constraints that have a significant bearing on the architecture.

- The system needs to be able to generate data automatically, simulating what happens in real malls.
- The system needs to be capable of keeping up with all the entrances and exits of people in all malls and stores.
- The application needs to be always consistent and updated, so that people (clients and security guards) that use the app don’t be misled by the real number of people in a certain place.
- At the end of each virtual day, the system needs to be able to update all the statistics for managers.

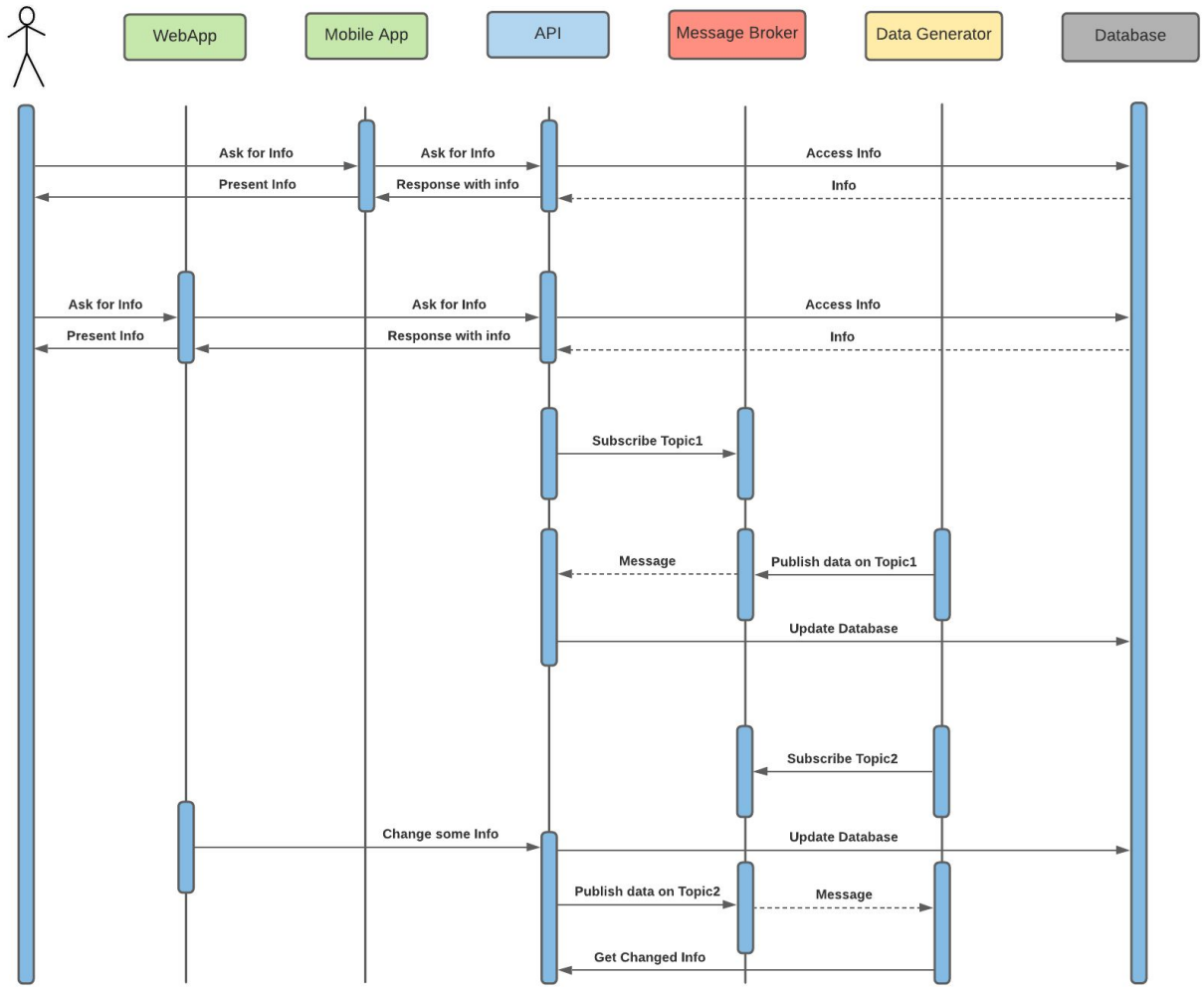
Architecture



Module interactions

1. The data will be generated through python scripts, and then published in a topic in the message broker.
2. The data in the message broker will be consumed by the logic implemented in *Spring Boot,* storing the data in the database.
3. Through the connection of the application with the back-end it will be possible for the application to receive processed data.
4. The client sees the information about a store, being made a request to the API for this purpose.
5. Through the API the requested data is sent to the database and then passed this information to the message broker.
6. Then the message broker will connect to the python script, which will generate new data.

Module interactions

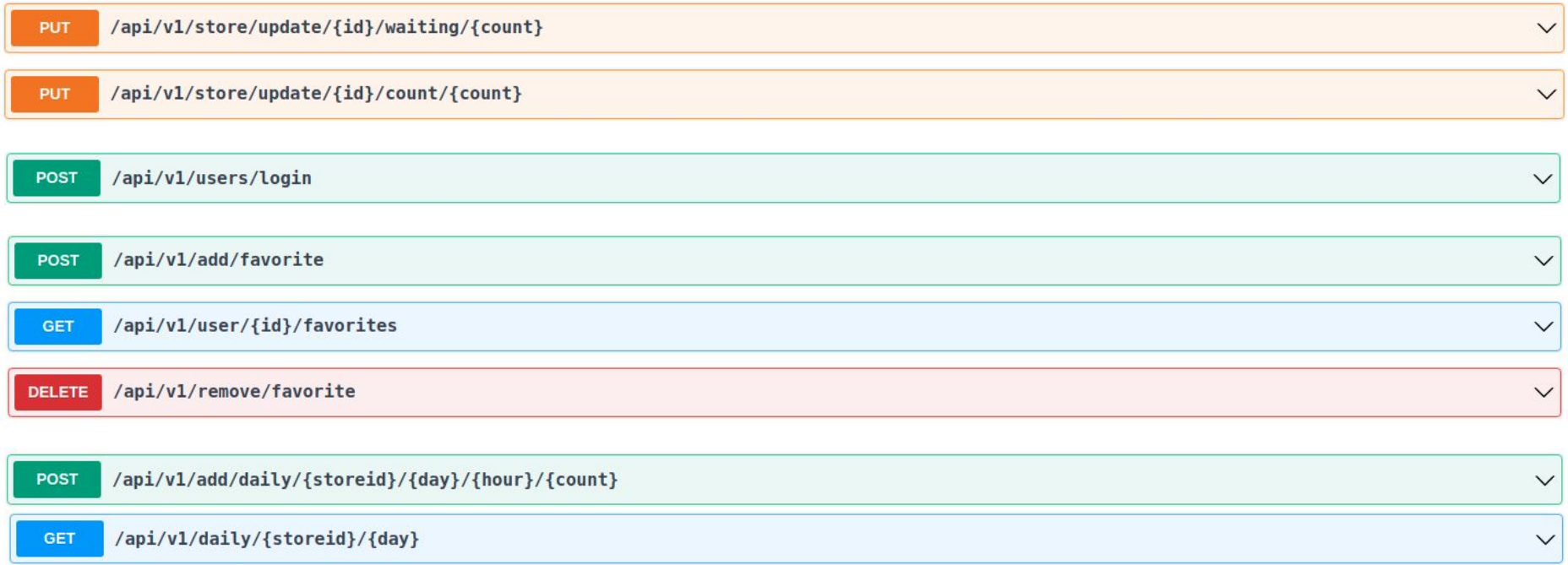


Springboot API / MySQL Database

Shopping	Stores	Users
id	*id*	*id*
name	name	type
opening_time	opening_time	name
closing_time	closing_time	username
stores	max_capacity	email
max_capacity	people_count	password
people_count	waiting	

FavStores	DailyInfo
id	*id*
user_id	storeid
store_id	day
	hour
	count

Springboot API



https://app.swaggerhub.com/apis-docs/InOutTracker/api-documentation/v1

Data Generation

- Python Script
- Always running
- Generate some data to populate the Database at the start
- Simulates a real mall:
  - Entrances
  - Exits
  - People waiting to enter a store
  - People disrespecting the maximum capacity
  - No movement on hours that the mall is closed
- Has one pulsar consumer and one pulsar producer

Web App

- Designed for Security Guards and Managers
- Useful for real time information and to analyze by day
- Alerts the security guards if something isn't right
- Can be accessed by clients too

Users:

- Can check how many people are in a store and waiting outside
- Can check shoppings opening and closing times
- Can check the number of people that were at a store on a past date
- Does not need an account in order to use it
- If logged in can add stores to favorites
- If it's admin, can add, edit and remove shoppings and stores
- If it's security, can receive notifications about stores too full


InOutTracker
Forum Aveiro
Oliciosa Plaza
Shopping Noturno
New Shopping

Mobile App

- Designed for clients
- Available anywhere
- Helpful while already on a shopping or at home
- Push Notifications
- Easier to Access

Users can:

- Check how many people are in a store and waiting outside
- Check stores opening and closing times
- Add stores to Favorites for Quick Access
- Follow stores to get updates of the number of people there
- Store Favorites by creating an account
- Can be used without creating an account